VIKRAM UNIVERSITY, UJJAIN MP

(Session -2022-2023 onwards)

BCA (Hon's) FOUR YEARS (EIGHT SEMESTERS), CBCS SCHEME (NEP)

S.No.	Paper code	Course Component and Name of Course	Credits			Marks		Total
			T	P	Total	Max Marks CCE Internals	Max Marks Theory Externals	
1.	BCAH 401 Major-1	Object Oriented Programming with Java	2	0	2	30	45	100
	BCAH P	Object Oriented Programming with Java	0	1	1	10	15	
2.	BCAH 402 Major-2	Computer Graphics	3	0	3	40	60	100
3.	BCAH 403 Minor-1	Software Engineering	3	0	3	40	60	100
4.	BCAH-404 Generic Elective	Internet and E-Commerce	3	0	3	40	60	100
5.	Ability Enhancement Course	Entrepreneurship Development	2	0	2	20	30	100
		Women Empowerment	2	0	2	20	30	
6.	Vocational/Skill Enhancement-Course from any faculty/Mooc Course	Web Development using PHP	4	0	4	40	60	100
Total Credits and marks					20			600

PART A: Introduction				
Program: Diploma		Class:	Year: II	Session: 2022-23
Subject: Computer Science				
1.	Course Code	**BCAH 401**		
2.	Course Title	**Object-Oriented Programming with Java**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major -I**		
4.	Pre-Requisite (if any)	Basic knowledge of computer and C, C++ language		
5.	Course Learning Outcomes(CLO)	1. To learn why Java is useful for the design of desktop and web applications. 2. To learn how to implement object-oriented designs with Java. 3. To identify Java language components and how they work together in applications. 4. To design and program stand-alone Java applications. 5. To learn how to design a graphical user interface (GUI) with Java Swing.		
6.	Credit Value	3		
7.	Total Marks	Max. Marks : 100(60+40)	Min. Passing Marks:	

PART B: Content of the Course		
Total No. of Lectures (in hours per week): 1 Hours per Day		
Total Lectures: 60 Hours		
Unit	Topics	No. of Lectures
I	Java Evolution, Overview of Java Language : Java Program Structure, Java Tokens, Java Statements, Java Virtual Machine, Command Line Arguments. Constants, Variables and Data Types : Constants, Variables, Data Types, Scope of Variables, Symbolic Constants, Type Casting. Operators : Arithmetic, Relational, Logical, Assignment, Increment & Decrement, Conditional, Bitwise, Special Operators, Arithmetic Expressions, Evaluation of Expressions, Type Conversions in Expressions, Operator Precedence and Associativity, Mathematical Functions.	12
II	Control Statements : Java's Selection Statements : If, Switch. Iterative Statements : While, Do-while, For, Some for loop variations, Nested Loops. Jump Statements : Using breaks, Using continue, return. Classes, Objects and Methods : Class Fundamentals, Declaring Objects, Assigning Object Reference Variables, Introducing Methods, Constructors, Visibility Control, The *this* Keyword, Garbage Collection, Overloading Methods, Recursion. Arrays, Strings and Vectors.	12
III	Inheritance : Inheritance basics, Using super, Creating Multilevel Hierarchy, Method Overriding, Dynamic Method Dispatch, Using Abstract Classes, Using	

	final with Inheritance, The Object Class. Packages and Interfaces : Java API Packages, Using System Packages, Creating & Accessing Packages, Hiding Classes, Access Protection, Importing Packages, Interfaces : Defining, Implementing, Applying Interfaces, Variables in Interfaces. Exception Handling: Exception-Handling Fundamentals, Exception Types, Uncaught Exception, Using try and catch, Multiple catch Clause, Nested try Statements, throw, throws, finally, Java's Built-in Exceptions. Multithreaded Programming: Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread.	12
IV	Applet Programming : Preparing to write Applets, Building Applet Code, Applet Life Cycle, Creating and Executable Applet, Designing a Web Page, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing parameters to Applet, Aligning the Display, Displaying Numerical values, Getting input from the User.	12
V	Introductory Graphics Programming : class, Lines , Rectangle, Circles, Ellipes, Arcs, Polygons, Line Graphs. I/O in Java : Streams, stream classes, Byte and Character stream classes. I/O exceptions, Interactive I/O. JDBC Connection and Implementation, Server side programming using Servlet and JSP.	12

PART C: Learning Resources
Textbooks, Reference Books, Other Resources
Suggested Readings: 1. 1. JAVA: The Complete Reference, Third Edition, P. Naughton & H. Schildt, Tata McGraw Hill. 2. Programming with Java, Second Edition, E. Balagurusamy, Tata McGraw-Hill 3. Teach Yourself JAVA, Joseph O'Neil & Herb Schildt, McGraw-Hill.
Suggestive digital platform web links:

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **100** Continuous Comprehensive Evaluation (CCE): **40** Marks University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**

External Assessment: University Exam (UE) Time: 03.00 Hours	Section (B): Five Short Questions Section (C): Five Long Questio	$04 \times 05 = 20$ $08 \times 05 = 40$ **Total Marks: 60**

PART A: Introduction				
Program: Diploma		Class: IV SEM	Year: II Year	Session: 2022-23
Subject: Computer Application				
1.	Course Code	**BCAH 402**		
2.	Course Title	**Computer Graphics**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Major II**		
4.	Pre-Requisite (if any)	To study this course, a student must have the basic knowledge of Computer and C Language .		
5.	Course Learning Outcomes(CLO)	• List out and Describe the Basic Concepts and terminologies Used in Computer Graphics • Discuss Issues Related to Emerging Electronic Technologies in concern of Graphic Design • Apply and Analyze different Approaches/ Algorithms for Drawing various graphics objects • Identify and Apply Various Geometrical Transformations Approaches • Implement Various Algorithms to Polygon Fill • Describe the Importance of Viewing and Projections • Identify Various Software systems Used in design, the Creation and Implementation of Multi-Media projects		
6.	Credit Value	6 credits		
7.	Total Marks	Max. Marks : 100	Min. Passing Marks: 40	

PART B: Content of the Course		
Total No. of Lectures (in hours per week): 01 Hour per day		
Total Lectures:90 Hours		
Unit	Topics	No. of Lectures
I	Overview of Graphic Systems: Display Devices, Refresh Cathode-Ray Tubes, Random-Scan and Raster-Scan Monitors, Color CRT Monitors, Direct-View Storages Tubes, Plasma-Panel Displays, LED and LCD Monitors. Hard-Copy Devices: Printers, Plotters. Interactive Input Devices.	18
	Output Primitives: Points and Lines, Line-Drawing Algorithms, DDA Algorithm, Bresenham's Line Algorithm, Antialiasing Lines, Circle-Generating Algorithms, Circle Equations, Bresenham's Circle Algorithm,	

II	Character Generation. Attribute of Output Primitives: Line Styles, Line Types, Line Width, Line Color. Color and Intensity: Color Tables, Gray Scale. Area Filling: Scan-Line Algorithm.	18
III	Two Dimensional Transformations: Basic Transformations, Translation, Scaling, Rotation. Matrix Representations and Homogeneous Coordinates. Composite Transformations: Translations, Scalings, Rotations, Scaling Relative to a Fixed Point, Rotation about a Pivot Point, General Transformation Equation. Windowing and Clipping: Windowing Concepts, Cliping Algorithms, Line Clipping, Polygon Clipping, Area Clipping, Text Clipping, Window to Viewport Transformation.	18
IV	Viewing in 3D: Three dimensional transformations, Translation, Scaling, Rotation. Matrix Representations projections: Parallel, prospective, viewpoints . Colour Model.	18
V	Introduction to Multimedia, Multimedia Components, Multimedia Hardware, SCSI, IDE, MCI, Multimedia Data and File Formats, RTF, TIFF, MIDI, JPEG, DIB, MPEG, Multimedia Tools, Presentation Tools, Authoring Tools. Computer Aided Design. Graphs Charts and Models. Computer Art, Computer Animation, Graphical User Interface, Graphics for Home use, Image Processing.	18

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

1. Computer Graphics, Donald Hearn and M.Pauline Baker, PHI 2nd Edition
2. Multimedia Making it Works, Third Edition: Tay Vaughan, Tata-McGraw-Hill
3. Procedural Elements of Computer Graphics, Rogers, McGraw Hill
4. Principles of Interactive Computer Graphics, Newman and Sproull, McGraw Hill
5. Mathematical Elements of Computer Graphics, Rogers, McGraw Hill

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **100** Continuous Comprehensive Evaluation (CCE): **40** Marks University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A):Short Answer type questions Section (B): Long Answer Type Questions	$04 \times 05 = 20$ $08 \times 05 = 40$ **Total Marks: 60**

PART A: Introduction				
Program: Diploma	Class: IV Sem	Year: II Year	Session: 2022-23	
Subject: Computer Application				
1.	Course Code	**BCAH 403**		
2.	Course Title	**Software Engineering**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Minor I**		
4.	Pre-Requisite (if any)	To study this course, a student must have the basic knowledge of Computers.		
5.	Course Learning Outcomes(CLO)	• Study a body of knowledge relating to Software Engineering, Software reengineering, and maintenance; • Understand the principles of large scale software systems, and the processes that are used to build them; • Programming, OO testing and maintenance; • Use tools and techniques for producing application software solutions from informal and semi-formal problem specifications; • Acquire and develop many valuable skills such as the ability to use computer aided software • Engineering tools to analyze, evaluate, select and synthesize information sources for the purpose of developing a software system; • Develop an appreciation of the cost, quality, and management issues involved in software construction; • Develop an awareness of the role and responsibilities of the professional software engineer; • Acquire skills to think about problems and their solutions using appropriate methods of analysis and design;		
6.	Credit Value	6		
7.	Total Marks	Max. Marks : 100(60+40)	Min. Passing Marks:	

PART B: Content of the Course		
Total No. of Lectures (in hours per week): 1 Hours per Day		
Total Lectures: 60Hours		
Unit	Topics	No. of Lectures
I	Introduction to Software Engineering : Software development, and life cycle; Project size and its categories; Planning a software project.	12
	Project control & Project team standards; Design of solution strategies;	

II	Software cost estimation and evaluation techniques.	12
III	Software Design : Various Design concepts and notations; Modern design techniques; Verification and validation methods; Documentation & implementation procedures; Performance of software systems; Software metrics and models. Documentation of Project-systems, manuals and implementation.	12
IV	Software Reliability : Definition and concept of software reliability; software errors, faults, repair and availability; Reavailability & availability models; Use of database as a study tool.	12
V	Modern Programming Language Features Relevant to Software Engineering: data abstraction, exception handling, concurrency mechanism, etc; Software development environments.	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

1. Fairley, B.E. : Software Engineering concepts, Mcgraw- Hill 1985.
2. Lewis, T.G. : Software Engineering concepts, Mcgraw Hill,1982.
3. Kernighan,B., Plauger, P. : software tools, Addison Wesley ,1976.
4. Meyers,G. : The Art of software testing, Wiley-inter- science,1979.
5. Gehani,N : Introduction of ADA, Mcgraw Hill, 1983.
6. Chatree : Software engineering concepts.
7. Hiborard : Constructing Quality software.

Suggestive digital platform web links:

1. https://onlinecourses.nptel.ac.in/noc21_cs42/preview
2. https://nptel.ac.in/courses/106/105/106105077/
3. https://nptel.ac.in/courses/106/105/106105078/

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **100** Continuous Comprehensive Evaluation (CCE): **40** Marks University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
External Assessment: University Exam (UE) Time: 03.00 Hours	Section (A): Five Short Questions Section (B): Five Long Questions	04 × 05 = 20 08 × 05= 40 **Total Marks: 60**

PART A: Introduction				
Program: Diploma		Class: IV Sem	Year: II Year	Session: 2022-23
Subject: Computer Application				
1.	Course Code	**BCAH 404**		
2.	Course Title	**Internet of Things (IoT)**		
3.	Course Type (Core Course/Elective/Generic Elective/ Vocational	**Generic Elective**		
4.	Pre-Requisite (if any)	Students must have basic computer knowledge		
5.	Course Learning Outcomes(CLO)	After completing this course student will be able to: 1. To understand the basics of internet of things 2. To get an idea of some of the applications areas where internet of things can be applied 3. To understand the middle where for internet of things and the concept of web of things 4. To understand the IOT protocol		
6.	Credit Value	3		
7.	Total Marks	Max. Marks : 100(60+40)	Min. Passing Marks:	

PART B: Content of the Course		
Total No. of Lectures (in hours per week): 1 Hours per Day		
Total Lectures: 60Hours		
Unit	Topics	No. of Lectures

I	Introduction:definition, characteristics of IOT,IOTconceptualframework,IOT architectural view, physical design of IOT, logical design of IOT, application of IOT.	12
II	Machine- to- machine (M2M), SDN (software design networking) and NFV(network function virtualization) for IOT, data storage in IOT,IOT cloud based services.	12
III	Design principles for web Connectivity: web communication protocol for connected devices, message communication protocol for connected Devices, SOAP,REST, HTTP Restful and web sockets. Internet connectivity principles: internet connectivity ,internet based communication, IP addressing in IOT, media access control.	12
IV	Sensor technology ,participatory sensing, industrial IOT and automotive IOT, Actuator, sensor data communication protocol, radio frequency identification technology, wireless sensor network technology.	12
V	Iot design methodology specification- requirement, process, model, service, functional and operational view.IOT privacy and security solution, raspberry IP and arduinodevices.IOT case studies: smart city streetlights control and monitoring	12

PART C: Learning Resources

Textbooks, Reference Books, Other Resources

Suggested Readings:

Text books:

- Rajkamal internet of things Tata McGraw hill publication.
- HakimaChaouchi"the internet of things: connecting objects",wiley publication.
- Francis DaCosta thinking the internet of things scalable approach to connecting everything first edition a press publication 2013.
- Donald Norris "The internet of thingsDo -it -yourself at home project for Arduino, raspberry Pi and BeagleBone Black", McGrawhill publication.

Reference books:

- Philip Levis, "TinyOS Programming"
- D. Norris,The internet of things Do -it -yourself project with Arduino, raspberry Pi and BeagleBone Black", McGrawhillpublication,New Delhi.
- Rajkamal,"Internet of things: architecture and design" ,Tata McGraw hill publication.
- A. Pajankar and A.Kakkar,"Raspberry Pi by example",Packt publishing Ltd,birmingham,UK.
- Books published by M.P. Hindi GranthAcademy,Bhopal

Suggestive digital platform web links:

- https://www.iotforall.com/ introduction – iot- application -in -education
- http://onlinecourses.swayam2.ac.in/arp19_ap52/preview
- http://www.mp Hindi granth academy.org/

Part D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods: Maximum Marks: **100** Continuous Comprehensive Evaluation (CCE): **40** Marks University Exam (UE): **60** Marks		
Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	20 20 **Total Marks: 40**
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